

WHAT IS CLAIMED IS:

1. A microfluidic device, comprising:
a body structure comprising at least a first microscale channel network disposed therein, the body structure having a plurality of ports disposed in the body structure in fluid communication with the first microscale channel network; and,
a cover layer comprising a plurality of apertures disposed through the cover layer and at least first and second annular rings arranged circumferentially around each of the apertures and extending downwardly from a lower surface of the cover layer, the cover layer being mated with the body structure whereby each of the apertures is aligned with at least one of the plurality of ports.
2. The microfluidic device of claim 1, further comprising an annular groove which extends circumferentially around each of the plurality of apertures of the cover layer and is disposed between the first and second annular rings.
3. The microfluidic device of claim 1, wherein the first and second annular rings have a width of between about 0.2 and 0.7 mm.
4. The microfluidic device of claim 1, wherein the first and second annular rings have a width of between about 0.4 and 0.5 mm.
5. The microfluidic device of claim 2, wherein each of the annular grooves have a width of between about 0.2 and 0.8 mm.
6. The microfluidic device of claim 1, wherein each of the annular grooves have a depth of between about 0.3 and 0.5 mm.
7. The microfluidic device of claim 1, wherein the cover layer is bonded to the body structure with an adhesive.
8. The microfluidic device of claim 7, wherein the adhesive is a UV curable adhesive.
9. The microfluidic device of claim 1, wherein the cover layer is an injection molded polymeric part.

10. The microfluidic device of claim 1, wherein the cover layer is a cast polymer part.

11. The microfluidic device of claim 1, wherein the body structure comprises first and second planar substrates which comprise silica based substrates.

12. The microfluidic device of claim 11, wherein the silica based substrates are made from glass.

13. The microfluidic device of claim 1, wherein the body structure comprises first and second substrates made from a polymeric material.

14. The microfluidic device of claim 13, wherein the polymeric substrate is selected from polymethylmethacrylate (PMMA), polycarbonate, polytetrafluoroethylene, polyvinylchloride (PVC), polycycloolefin, polydimethylsiloxane (PDMS), polysulfone, polystyrene, polymethylpentene, polypropylene, polyethylene, polyvinylidene fluoride and ABS.